



Department of Computer Science
& Information Engineering

資 訊 工 程 系

人工智慧與邊緣運算實務

OC

Intel DevCloud 安裝與測試

雲端計算 (Cloud Computing)

訓練 / 推論 / 儲存



雲端伺服器
Cloud Server

邊緣計算 (Edge Computing)

推論

非同步(可離線)

微量推論結果

深度學習模型

推論結果

AI 晶片

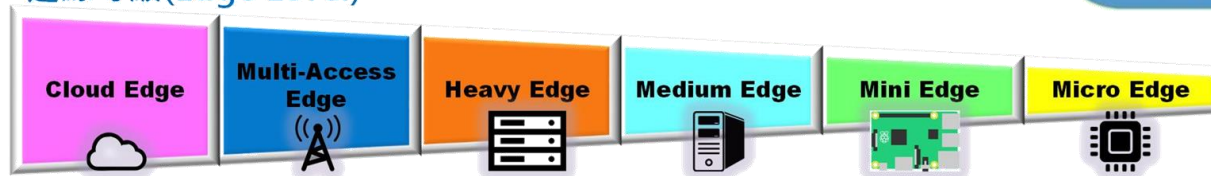
聲音 影像 感測器

低延遲

高隱私 低成本

巨量通訊

邊緣等級(Edge Level)



資訊工程系 許哲豪 助理教授

簡報大綱

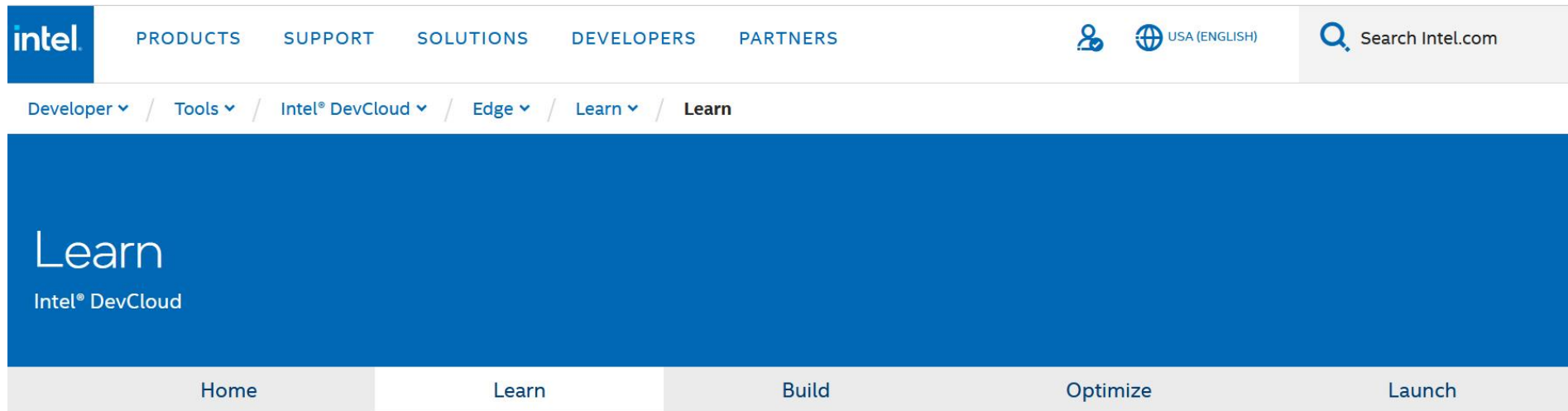
➤ Intel DevCloud簡介

- 帳號申請
- 支援硬體
- 系統架構
- 工作環境
- 預設環境
- 推論引擎

➤ 範例

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 - 工作流程
 - 執行結果
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 - 工作排程指令
 - 工作流程
 - 執行結果比較
 - Time
 - FPS
 - Dashboard

Intel DevCloud簡介



Get Started



Tutorials

Access tutorials to get you started with Intel® DevCloud, and get your deep-learning models and AI applications ready for deployment.

[Learn More](#)



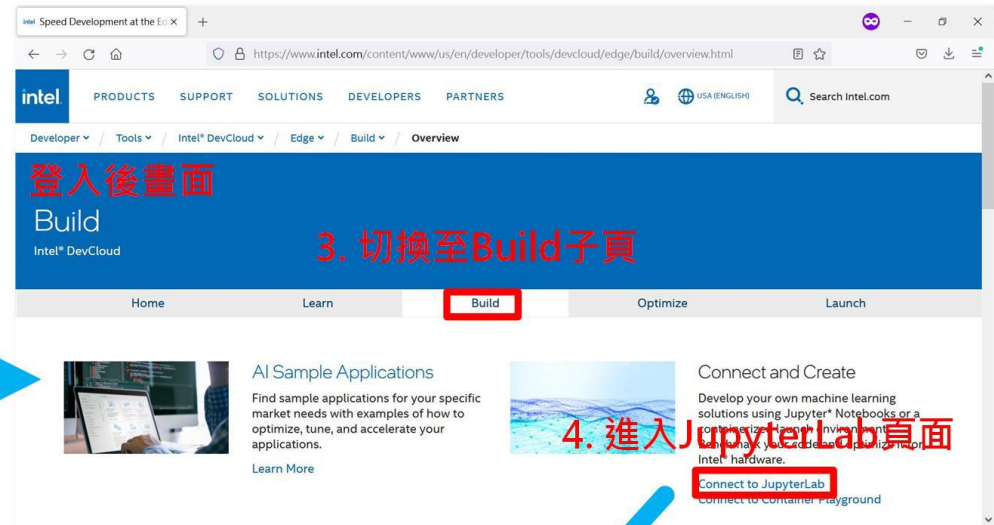
Sample Applications

Find sample applications for your specific market needs with examples of how to optimize, tune, and accelerate your applications.

[Learn More](#)

Intel OpenVINO雲端測試服務 <https://devcloud.intel.com/edge/>

Intel DevCloud帳號申請及進入



* JupyterLab
* Container Playground

Intel OpenVINO雲端測試服務 <https://devcloud.intel.com/edge/>

Intel DevCloud支援硬體清單

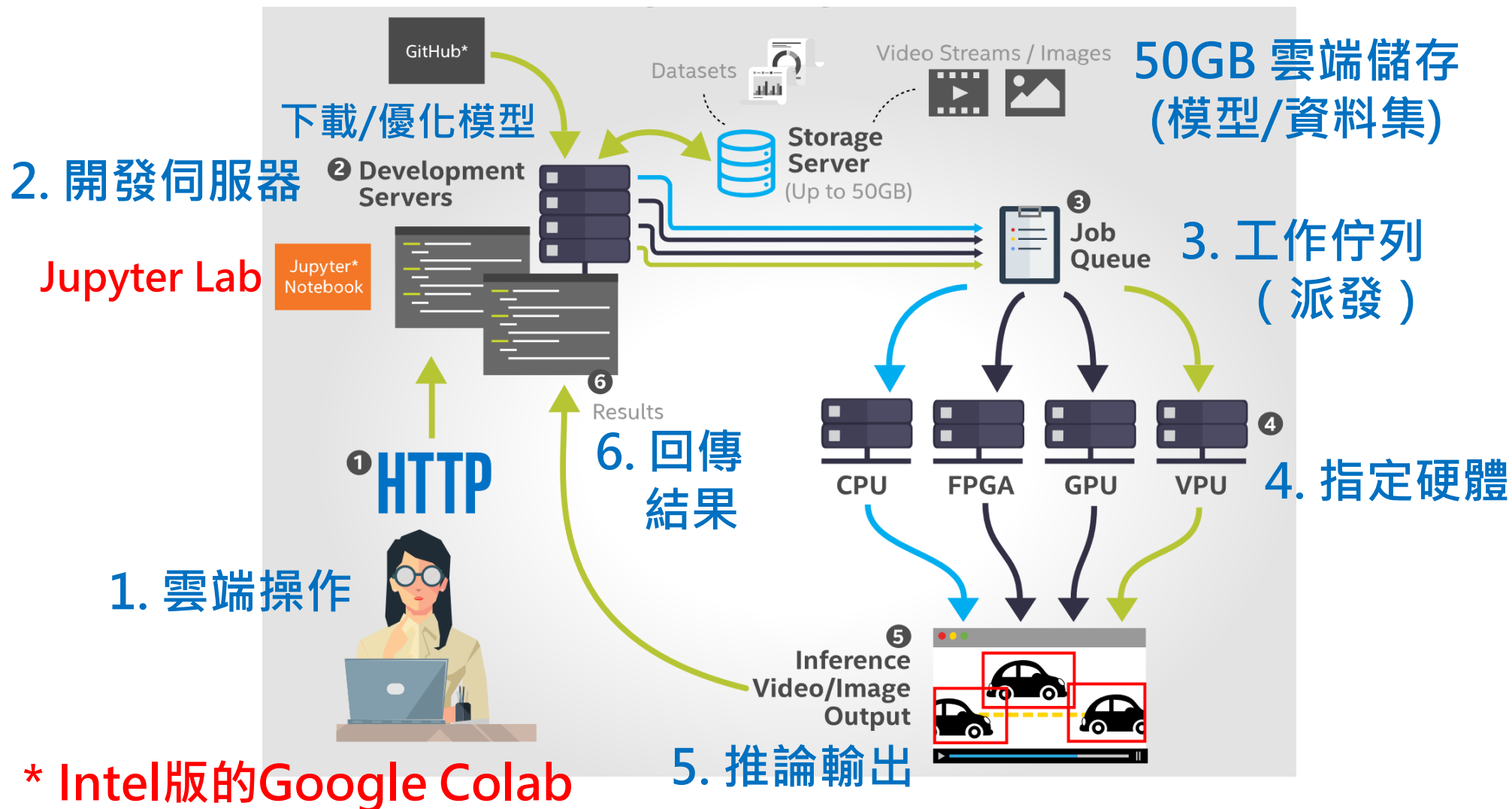


Processor	Processor Family	RAM	Integrated GPU	Inference Accelerator		Queue Label			Group ID	
Intel® Core™ i5-6442EQ Processor	Skylake	8 GB	Intel® HD Graphics Driver 530	None		idc011ark2250s compnode advantech intel-core i5-6442eq skylake intel-hd-530 ram8gb net1gbe			idc011ark2250s	
Intel Core i5 6500TE Processor	Skylake	8 GB	Intel HD Graphics Driver 530	Intel Xeon Gold processor 6338N	Ice Lake-SP	128 GB	None	None	idc052 compnode smci intel-xeon 6338n ice-lake ram128gb net1gbe	idc052
				Intel Core i7-1185G7E Processor	Tiger Lake	16 GB	Intel® Iris® X ^E graphics	None	idc045 compnode openvino-latest intel-core i7-1185g7e iris xe graphics ram16gb tiger lake	idc045
		8 GB	Intel HD Graphics Driver 530	Intel Core i5-1145G7E Processor	Tiger Lake	16 GB	Intel Iris X ^E graphics	None	idc046 compnode openvino-latest intel-core i5-1145g7e iris xe graphics ram16gb tiger lake	idc045
				Pentium® Processor J6426	Elkhart Lake	4 GB	Intel UHD Graphics 530	None	idc070,compnode,openvino-latest,intel-pentium,j6426,intel-uhd-10th-gen,ram4gb,none	idc070
		8 GB	Intel HD Graphics Driver 530	Intel Atom® x6425RE Processor	Elkhart Lake	16 GB	Intel UHD Graphics 530	Done	idc071,compnode,openvino-latest,intel-atom,x6425re,intel-uhd-10th-gen,ram16gb,none	idc071

Group ID

資料來源：<https://www.intel.com/content/www/us/en/secure/developer/devcloud/edge/run-your-code.html>

Intel DevCloud系統架構



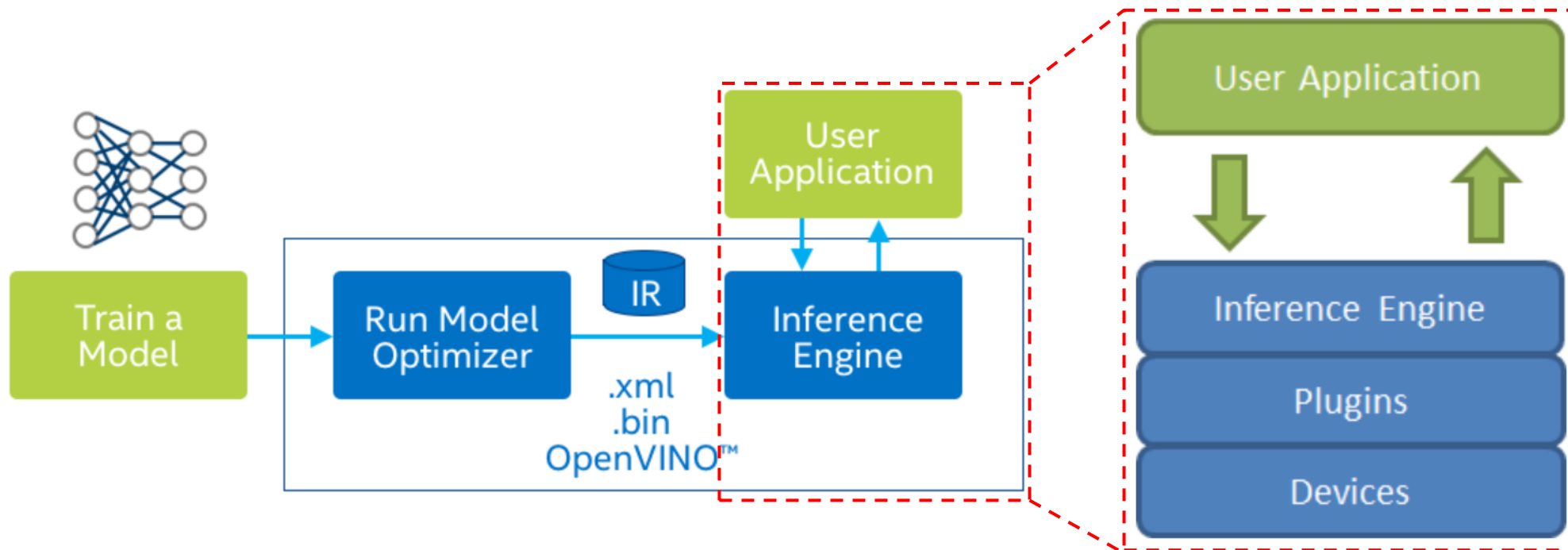
DevCloud JupyterLab工作環境

The screenshot displays the JupyterLab Launcher interface. On the left is a file browser showing a directory structure with folders like 'My-Notebooks', 'omz_demos_build', and 'Reference-samples', and a file 'Untitled.ipynb' modified 3 minutes ago. The main area is titled 'Launcher' and features three sections: 'Notebook', 'Console', and 'Other'. Each section contains icons for different environments: OpenVINO 2022.1+, Python 3.8 (XPython Raw), and Python 3.8 (XPython). Red text annotations are overlaid on the image: '剩餘使用時間' (Remaining usage time) at the top right, 'Jupyter Notebook編輯模式 (預設十小時)' (Jupyter Notebook editing mode (default 10 hours)) next to the Notebook section, '終端機操作模式' (Terminal operation mode) next to the Console section, and '其它操作模式' (Other operation modes) next to the Other section. The top navigation bar includes 'File', 'Edit', 'View', 'Run', 'Kernel', 'Tabs', 'Settings', and 'Help'. The bottom status bar shows 'Simple' mode and resource usage.

DevCloud預設執行環境

- CPU
 - Intel(R) Xeon(R) Gold 6138 CPU @ 2.00GHz
- Ubuntu 18.04.6 (LTS)
- Jupyter Notebook
- OpenVINO
 - 2022.1
 - 2022.1 + TF 1.15.1
- Python 3.6.9
- Python預安裝項目
 - numpy 1.18.5
 - onnx 1.10.2
 - opencv-python 4.5.4
 - pip 21.3.1
 - tensorboard 1.15.0
 - tensorflow 1.15.5
 - torch 1.4.0
 - torchvision 0.5.0
- 其它預安裝套件可以使用 `pip list` 查詢

OpenVINO推論引擎架構



基本說明及影像分類範例

Learn / Get Started / Tutorials



Tutorials

Access tutorials to get you started with Intel® DevCloud, and get your deep-learning models and AI applications ready for deployment.

[Learn More](#)

指定單一硬體執行
影像分類範例



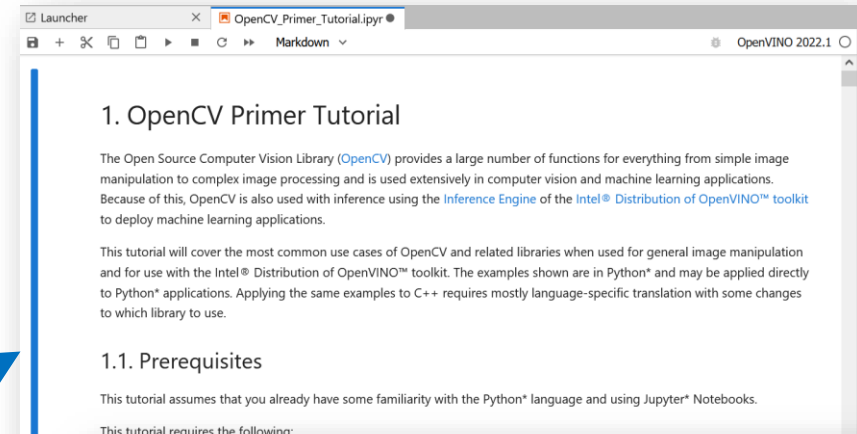
Classification

ID: 679025

Date: 09/29/21

Classify and report the probability of objects from image and video input with a SqueezeNet 1.1 model and the Intel® Distribution...

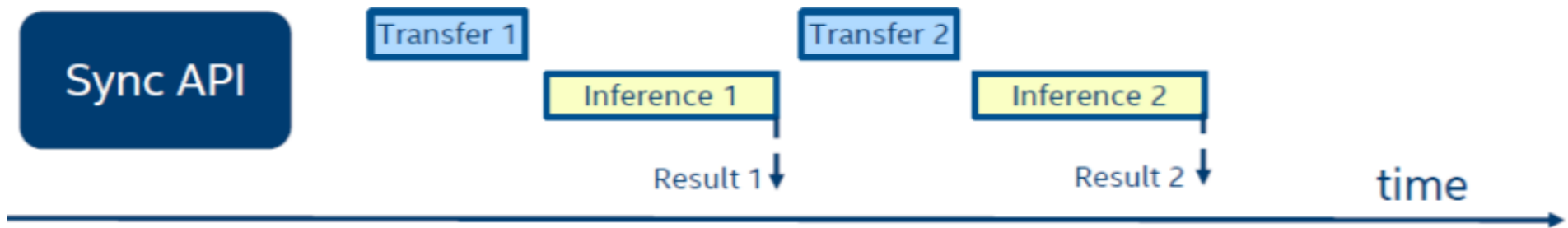
啟動範例程式



執行結果

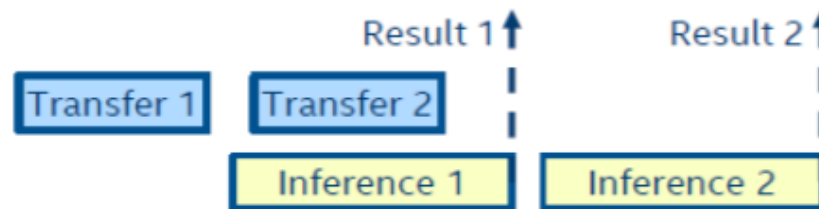
異步工作加速原理

同步工作



Async API

異步工作



工作排程指令

- 多工批次
 - `nodes=x:ppn=y` (x, y 為節點及節點運算單元數量)
- 工作派送
 - `qsub`
 - 成功回傳ID
- 查看狀態 / 取消作業
 - `qstat / qdel`
- 檢查所有支援硬體資訊及數量
 - `!pbsnodes | grep compnode | awk '{print $3}' | sort | uniq -c`

異步執行物件偵測及效能分析

Build / AI Sample Applications



AI Sample Applications

Find sample applications for your specific market needs with examples of how to optimize, tune, and accelerate your applications.

[Learn More](#)

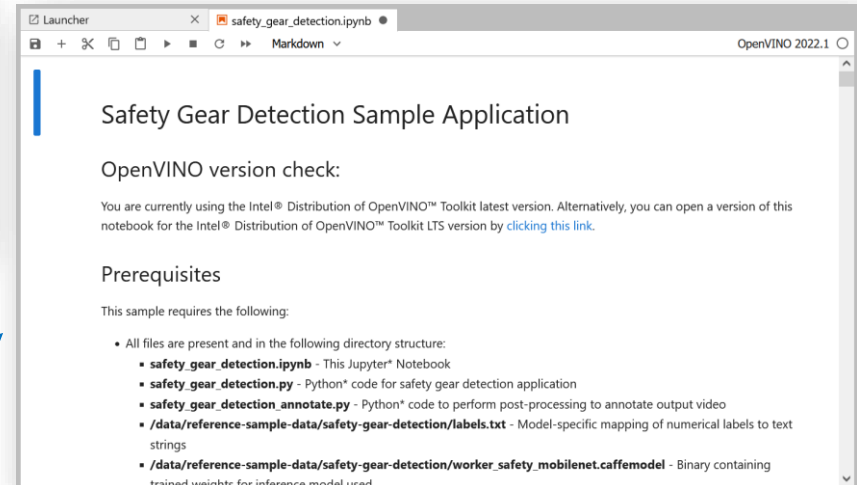
指定多種硬體
同步執行
物件偵測範例



Safety Gear Detection

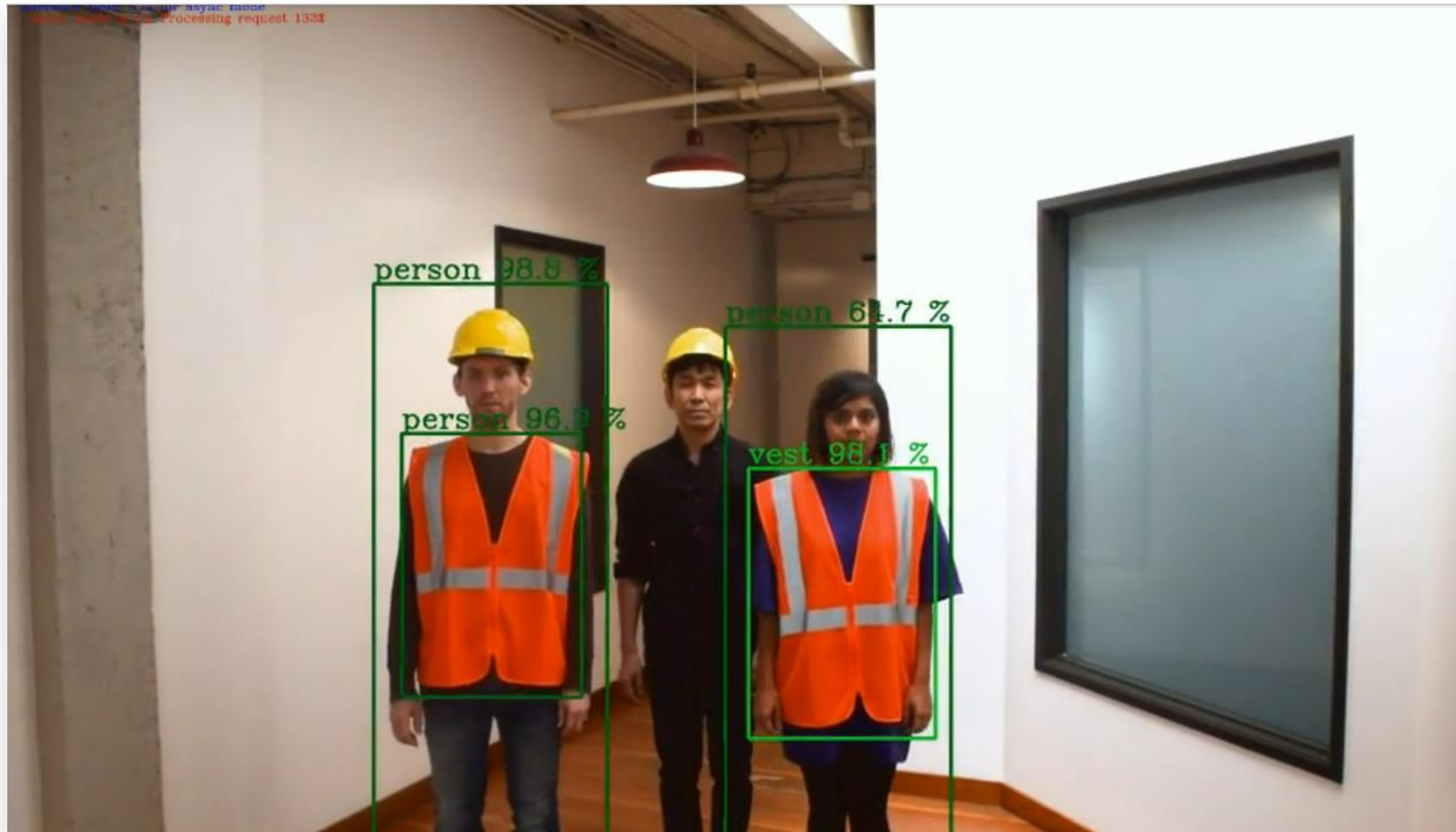
Detect people and their safety gear from video input that uses an optimized, pretrained MobileNet* single-shot detector (SSD) neural network.

safety_gear_detection.ipynb

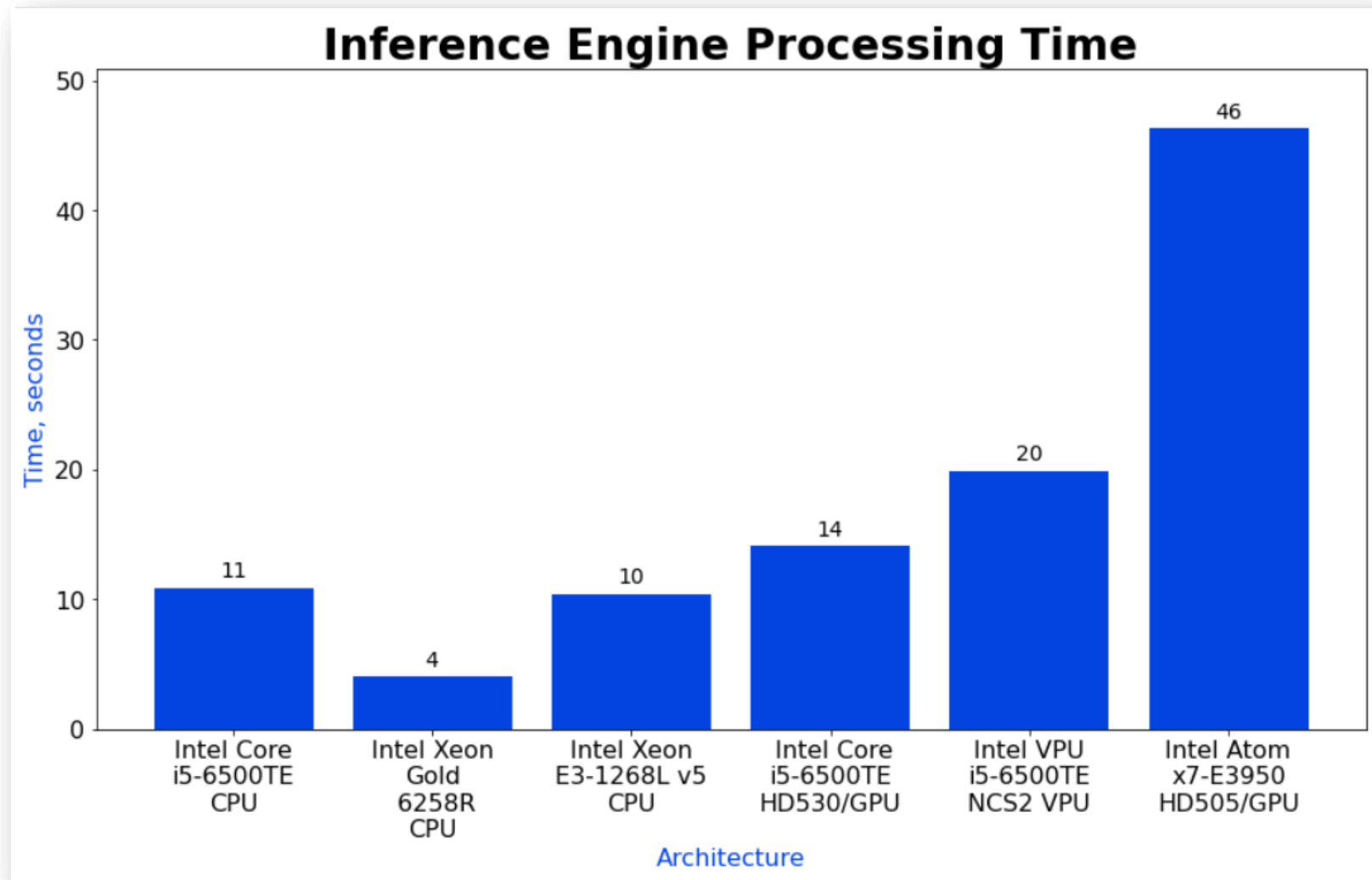


將游標移至 `liveQstat()`
 點擊主選單 **Kernel / Restart
 Kernel and Run up to
 Selected Cell ...**
 等待所有指定硬體都推論完

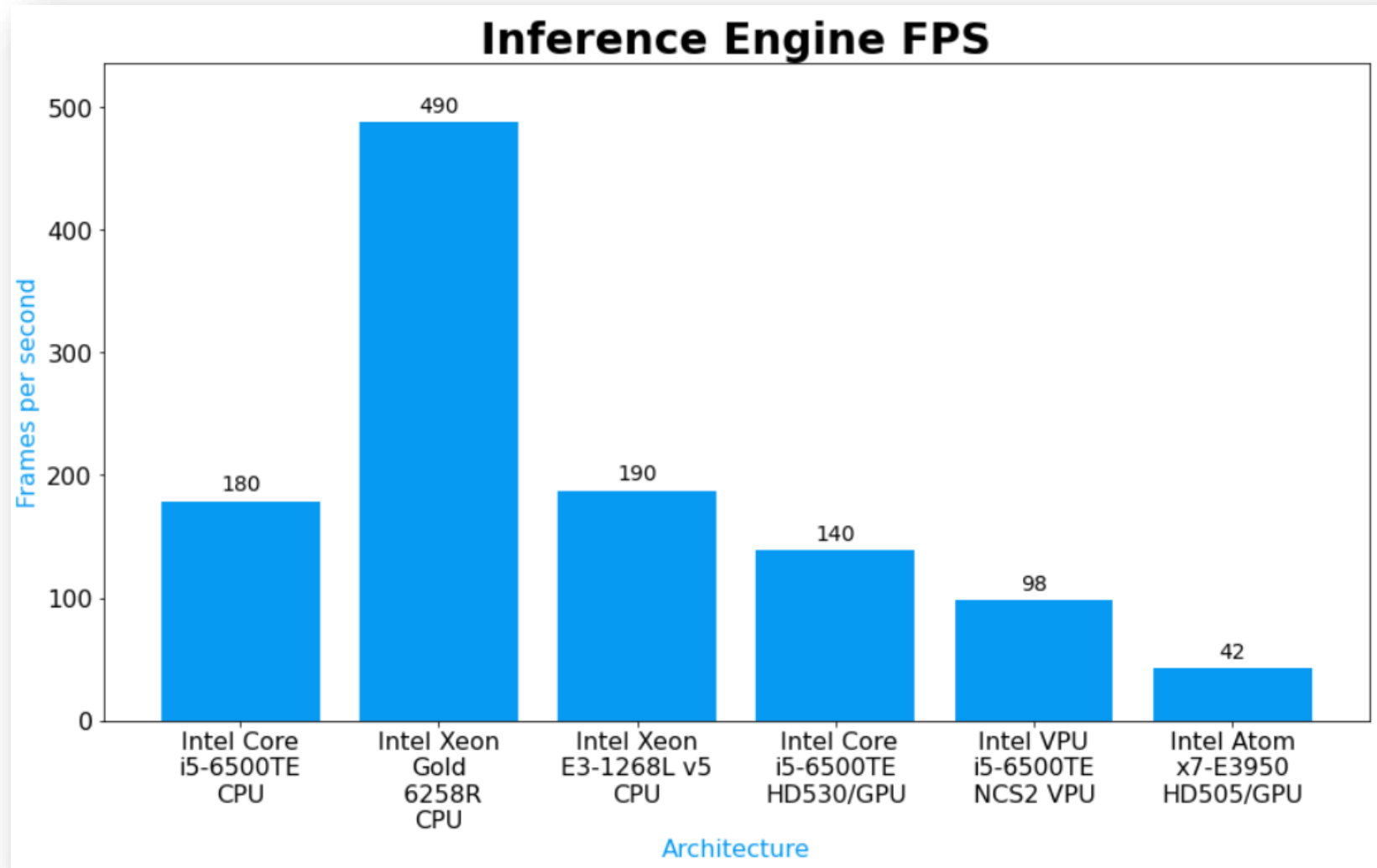
物件偵測結果



物件偵測結果比較(Time)

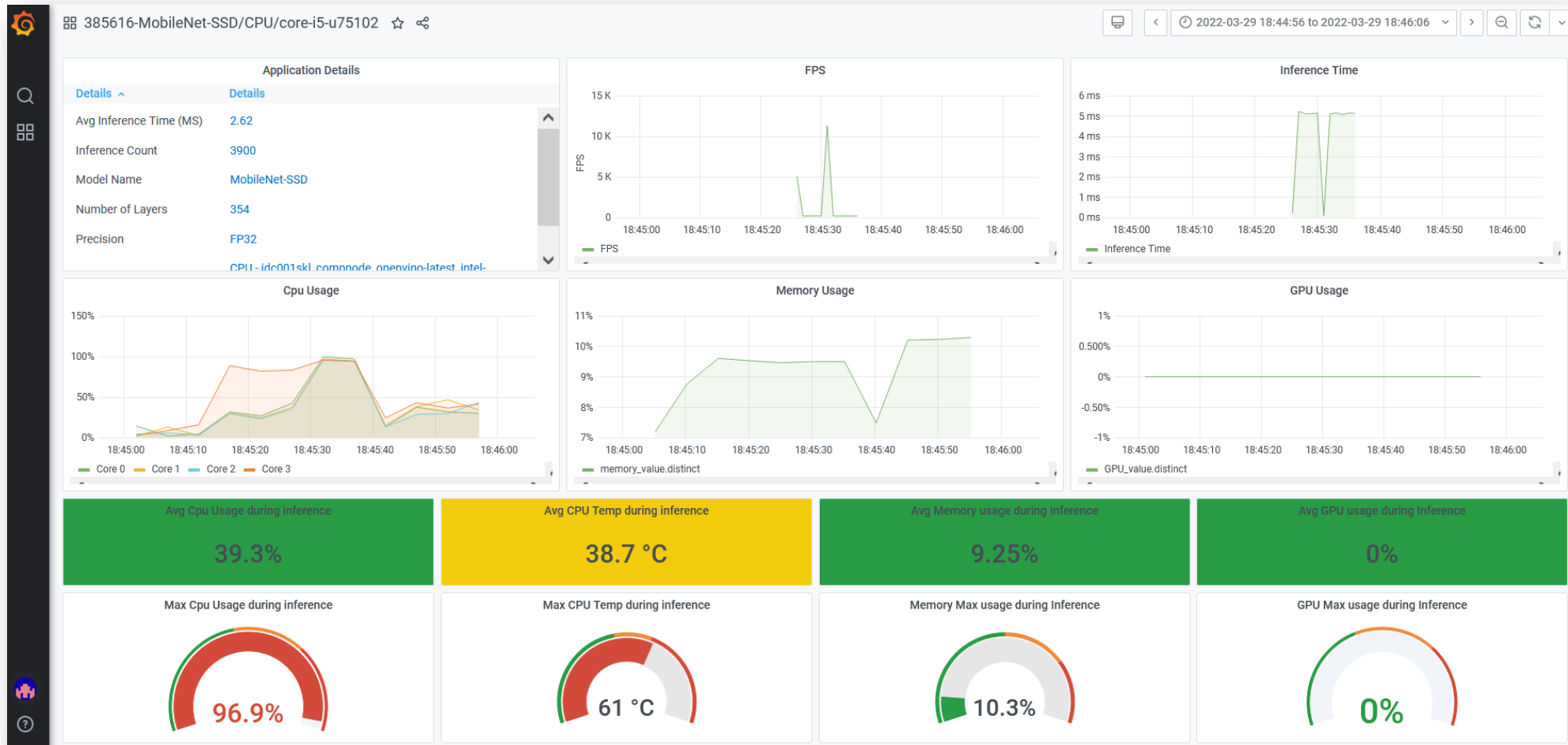


物件偵測結果比較(FPS)



物件偵測結果-Dashboard

Intel Core i5-6500TE



小結

- Intel DevCloud提供一個和Google Colab類似的開發環境，可使用Jupyter Notebook進行開發。
- 系統已預安裝好OpenVINO、OpenCV及相關套件包。
- 程式可直接在CPU下執行或以指派工作方式平行執行，並可繪製測試速度數據比較圖。
- 完成的程式易於佈署在指定硬體上。

參考文獻

➤ Intel DevCloud

<https://devcloud.intel.com/edge/>

➤ Intel® DevCloud for Edge | OpenVINO™ toolkit |
Ep. 58

<https://youtu.be/OgNnBnzlsZs>

➤ Intel OpenVINO

<https://docs.openvinotoolkit.org/latest/index.html>